Feature Article

OUTPUT AND EMPLOYMENT IN THE SCOTTISH SERVICE SECTOR

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1. Introduction

The work described in this paper has its origin in two studies. For several years the authors have been working on an econometric model for Scotland, details of which will be published shortly (Dewhurst and Lythe (1984)). In this model, Scottish output is treated as the sum of the output in different industries. In each industry, output is modelled as dependent upon demand, and employment as dependent on output. So the modelling required some preliminary analysis, albeit at fairly aggregative level, about the determinants of output and employment in the Scottish Service Sector. The more immediate background to this study, however, is a project undertaken for the Industry Department for Scotland, in which the authors have constructed an output index for the service sector for Scotland from 1962 to 1980 and have undertaken some preliminary investigation of what might have explained the behaviour of output, employment and labour productivity in Scotland over these years. The authors are grateful to the Department for permission to publish this paper before the full reports of their work (Dewhurst, Lythe and Peterson (1984)) are available. They wish to make it clear that the procedures they have used in this study are their own responsibility, and that the opinions they express in this paper are their own, freely given.

2. The Importance of the Service Sector

In terms of its share of employment and output, it is difficult to overstate the importance of the service sector to the Scottish economy. Table 1 analyses employment in Scotland and in the UK in selected years from 1962 to 1982, in terms of the importance first of broad sectors and then of individual service industries to the total of employees in employment. Table 2 offers a similar analysis in terms of the contribution of sectors, and individual service industries to output.

Two conclusions emerge clearly from these tables. First, the pattern of activity in each year is broadly similar in Scotland and in the UK - there are differences, particularly in the extent to which the UK's share of activity in manufacturing has been more stable than Scotland's but these are relatively small. Secondly, in both economies services have been growing in importance: it is reasonable to say that now services represent about 60% of Scottish economic activity, whereas 20 years ago the share was under 50% and if the analysis were taken back to the mid 1950's the share would be only around 45%.

One way of interpreting Tables 1 and 2 is to focus on the behaviour of manufacturing, and to argue that the declining share of output coming from manufacturing is a sign of serious weakness in both the Scottish and UK economies - the phenomenon known as de-industrialisation(1). De-industrialisation is claimed to be dangerous on three main grounds. First, for an open economy like the UK, and even more for Scotland, foreign trade considerations are important, and historically the UK has paid for its net imports of food by being a net exporter of manufactures. Secondly, it is in manufacturing that it is most obvious that growth can be achieved through rising productivity of labour - the UK has achieved a rise in real output per man-hour in manufacturing of the order of 2%-3% per annum since the

TABLE 1

Shares of Economic Activity: Employees in Employment

1968 Standard Industrial Classification Orders		1962 Scotland %	1962 UK %	1972 Scotland %	1972 UK %	1982 Scotland %	1982 UK %
I-II	Primary Sector	8.2	6.2	4.6	3.6	4.6	3.2
III-XIX	Manufacturing	34.3	37.7	32.3	35.2	25.4	27.4
XX-XXI	Public Utilities	9.4	8.5	9.4	7.5	8.4	6.6
XXII-XXVII	All Services	48.0	47.7	53.6	53.6	62.6	63.0
XXII	Transport and Communications	8.4	7.5	6.9	7.0	6.6	6.6
XXIII	Distributive Trades	13.7	12.6	11.9	11.9	11.8	12.8
XXIV	Insurance, Banking and Finance	2.1	3.2	3.3	4.5		6.3
XXV	Professional and Scientific Services	10.2	9.9	15.1	14.0	36.3	17.9
XXVI	Miscellaneous Services	8.1	8.5	9.5	9.2		12.1
XXVII	Public Administration & Defence	5.5	6.0	6.9	7.8	8.0	7.3
Number of Employees in Employment ('000)		2,093	22,447	1,989	22,118	1,872	21,223

Source: Scotland 1962, 1972 Dundee Scottish Economic Modelling Group Research Paper 81/V/1.

1982 Scottish Abstract of Statistics, 1983.

UK 1962 Department of Employment Gazette, October 1975

1972 Department of Employment Gazette, September 1973.

1982 Annual Abstract of Statistics, 1984

TABLE 2

Shares of Economic Activity: Output[1]

1968 Standard Industrial Classification Orders		1962 Scotland %	1962 UK %	1972 Scotland %	1972 UK %	1981 Scotland %	1981 UK %
I-II	Primary Sector	10.0	7.2	6.7	4.3	7.9	9.6
III-XIX	Manufacturing	32.4	35.4	30.6	32.0	22.9	24.5
XX-XXI	Public Utilities	11.8	9.9	12.6	10.9	12.3	9.5
XXII-XXVII	All Services	46.1	47.5	50.1	52.7	57.9	56.4
XXII	Transport and Communication	9.3	8.8	8.6	8.3	8.3	7.8
XXIII	Distributive Trades	11.1	12.3	11.3	11.4	9.3	9.9
XXIV	Insurance, Banking and Finance	2.8	3.5	3.8	7.7	6.7	8.7
XXV	Professional and Scientific services	16.7	16.9	19.9	10.6	25.8	13.1
XXVI	Miscellaneous Services				7.9		9.5
XXVII	Public Administration and Defence	6.5	6.0	6.9	6.8	8.0	7.4

[1]Shares of GDP, exclusive of ownership of dwellings, and inclusive of stock appreciation.

Source: Scotland 1962 and 1972 Lythe and Majmudar The Renaissance of the Scottish Economy? Table 2.3.

1981 Scottish Economic Abstracts, No 27, 1983.

UK 1962 National Income and Expenditure, 1972.

1972 and 1981 National Income and Expenditure, 1982.

1950's, and this has clearly been the main contributor to the growth of measured national income per head over that period. Thirdly, it is argued that in some significant sense economic activity in the service sector depends on economic activity in manufacturing - the demand for services depends on income generated in manufacturing.

In this article, a different focus is suggested. There is plainly some validity in the views of those who view with alarm a decline in the share of manufacturing, especially if that decline takes the form of an absolute fall in manufacturing output. However, the implications that services have no significant contribution to make to the balance of payments, that services are not amenable to productivity growth, and that services are dependent on manufacturing are at best somewhat misleading generalisations. It is important to understand what the service sector does and how it contributes to the economy.

The study for the Industry Department of Scotland, evidence from which forms the main source from which this paper is written, examines the service sector excluding Public Administration and Defence. The focus of this paper is therefore on the service sector defined as comprising Transport and Communication, Distributive Trades, Insurance, Banking and Finance, Professional and Scientific Services and Miscellaneous Services - ie Orders XXII - XXVI of the 1968 Standard Industrial Classification.

3. Employment in the Service Sector

For many purposes, employment in an industry is properly defined as its working force - the number of people working in the industry, whether they are employees, employers or self-employed. The regularly published details of employment cover only part of the working force, employees in employment. For the other part of the working force, employers and the self-employed, information is collected in the Census of Population: this information is thus available in the period of this paper only for 1961, 1966 and 1971 (the required 1981 Census of and the Census of Population figures are presented only at the level of Orders, whereas in the present study the analysis of employment is at the more detailed level of Minimum List Headings (MLH) (of which there are 45 in the 5 Orders in the study), so there are no details at all of the number of employers and of self-employed that could be used. This is particularly frustrating, as the evidence from the 1971 Census of Population, summarised in Table 3 below, made it clear both that the numbers of employers and those in self-employment were quite substantial in some parts of the service sector and that the scale of the adjustment that would be necessary varied a great deal within the service sector.

TABLE 3

Employers and the Self-Employed in Scottish Services: 1971 Census of Population

Order(s)		Nos. ('000)	% Addition to No of Employees in Employment
XXII	Transport and Communication	5.1	3.6
XXIII	Distributive Trades	37.7	15.8
XXIV, XXV, XXVI	Professional, Financial and Misc. Services	2.3	7.9

As far as the numbers of employees in employment is concerned, there were a number of problems to be overcome in constructing a consistent series for 1962 to 1980 at MLH level. Broadly, information in the industrial detail required is published for 1971 to 1978 and for 1981, and rather more aggregated information, with some discontinuities, for other years. Various devices could be, and were, used to overcome the discontinuities. As a result of these manipulations, it is possible to construct a complete series for employees in employment by MLH of the 1968 Standard Industrial Classification, and these are the employment data used later in this paper. The reader should remember that the inability to incorporate employers and self-employment into the figures limits

their usefulness: it is a major inhibition on understanding the service sector that economists are so uncertain about the number of people working in it. This difficulty is not unique to the service sector (it applies also to agriculture and fishing) but appears to be particularly important in it.

The second problem about service employment data is also general to all employment analysis but especially significant to services. In examining output per employee, it is obviously important to know whether the employee is working full-time or part-time. Studies for Great Britain had suggested that part-time employment is important in some services - eg Robertson and Briggs (1979) concluded that in 1968 over 40% of the employees in Miscellaneous services in Great Britain were part-time. For the perind 1971-1978 the present authors were given access to unpublished figures which enabled them to identify for each MLH and for each sex how many employees were full-time and how many part-time, but comparable data were not obtainable for other years. To put together the full-timers and part-timers to arrive at a meaningful number of the labour force, a weighting factor is needed. Many studies use some fairly arbitrary factors - eg Smith (1972) and Robertson (1982) use a rule-of-thumb measure that two part-timers equal one full-timer. There are obvious dangers in such a crude approach, and Fuchs **et al** (1968) for the USA and Reddaway (1977) for the UK have been rather more sophisticated, constructing weights based on hours worked. The only relevant data for Scotland available to us on hours worked were in the 1971 Census of Population. What these showed was that there was considerable variation in the relationship of average hours worked by part-time to those worked by full-time employees (the full-time equivalent ratio) between MLHs and fairly great differences for many MLHs between the sexes. Most striking is MLH 701 (Railways), where a typical part-time man worked a quarter of the hours of a full-timer and a typical part-time woman 55% of the hours of a full-timer. In general there was more variation between MLHs in the full-time equivalent ratio for males (ranging between 0.245 to 0.661) than for females (0.325 to 0.603). The average ratio for males was fractionally below that for females, but in some MLHs the ratio for males was much greater than for females.

4. Output in the Service Sector

There are many conceptual problems in the identification of service output in any economy. In most industries other than services, there is a tangible output and the bought-in materials and semi-processed goods are tangible, so it is possible to identify the value added in the industry by the difference between the value of output and the value of materials used. There are, of course, many problems of measurement, but it is at least clear (usually) what is being made by the industry.

For 1971-1978, there was enough information to construct details of full-time equivalent employees in employment at the level of individual MLHs. As these were the only years for which this was possible, it is a useful check to work with those years to test the likely extent of the error made for other years by using the crude number of employees rather than full-time equivalents. The correlation of the two series was therefore examined at MLH level for the period 1971-78. The result of this exercise, summarised in Table 4, was encouraging. The only Order in which there was a poor association between the two series was Order XXIII (Distributive Trades), where the correlation seems to be particularly influenced by MLH 821 (Other retail distribution), which exhibited a correlation coefficient of 0.378. There were fairly low correlated coefficients for three other MLHs(2) but the effects at Order Level seem negligible. Thus, there is some evidence that most of the following results are not very substantially distorted by the use of total employees rather than full-time equivalents.

For some services the identification of output and of suitable indicators to measure it is fairly straight forward. For instance, the job of railways is to carry people and goods, and so if one can measure items like passenger-kilometres travelled one has a fairly good indicator of the output of the railways. But for many services it is not so simple - what, for example, is the output of medical services? If the number of people in hospital rises, does that mean an increase in its output (because more patients are

TABLE 4

Correlation Coefficients Between Number of Employees and in Employment and Full-time Equivalent Employees, Scottish Services, 1971-1978

Order		r
XXII	Transport and Communication	0.998
XXIII	Distributive Trades	0.410
XXIV	Insurance, Banking and Finance	0.991
XXV	Professional and Scientific Services	0.997
XXVI	Miscellaneous Services	0.996

being treated) or a decrease (because the population is less healthy)? Conceptual problems of this kind mean that frequently output in services is measured by one or other of two kinds of proxy indicator, dependent on expenditure or turnover or on input. Expenditure or turnover measures are in principle satisfactory if the service in question is marketed in competitive conditions, but for many services either the output is not sold or else it is sold in a market where price may be distorted very far from the cost of production, for instance because the service is provided by the public sector and social considerations affect the pricing policy. Input measures may also be quite satisfactory in some cases, because conceptually value added is made up of the value of all the activities in the industry and thus of all the inputs of the industries except bought-in materials. In practice, however, it is often true that the only available input proxy is the number of employees in the industry, and so the measure of output in the services is the same as the measure of employment. If this is so, the measure of output in the services is the same as the measure of employment. If this is so, there are acute problems in deciding what should be assumed about the productivity of labour. The convention adopted in the UK in such cases is to assume constant labour productivity(3), so that output moves **pari passu** with labour input. This is clearly unsatisfactory (and may lead to a systematically downward bias in measures of labour productivity in the service sector), but it is equally difficult to justify any alternative (such as those chosen in Belgium and West Germany which is to impute in such cases an increase in labour productivity equal to that in other services, or the Swedish convention that labour productivity is assumed to grow in this way in all services bar government service)(4).

In practice, for the Industry Department for Scotland study the authors were anxious to produce output measurements for Scotland that could be clearly compared to those of the UK, and so adopted procedures as close as possible to those used by Central Statistical Office (CSO) for the UK. For the period of the present study (1962-1980), CSO published three sets of indicators and weights used in measuring UK output at constant factor costs, the first being based on 1963 the second on 1970 and the third on 1975. The work for Scotland was related as closely as possible to the 1975-based methodology(5). There were three situations in which it departed from that CSO procedure, the first and second by force of circumstances and the third by choice. In the first kind of case it was not possible to follow CSO because even for the UK it would have been impossible to use the CSO method back as far as 1962. The situation arose frequently in Banking, Insurance and Finance, where CSO had made major changes in the 1975 series to try to portray the increasing sophistication of financial services, but in the process drew on data series which were not computed for years before the early 1970s. Secondly, and much more commonly, it was not possible to follow CSO procedures because there was no Scottish parallel for the UK information used by CSO, the Scottish data being either absent or insuffficiently comprehensive. Thirdly in a few instances, it was decided not to follow the CSO method because of a belief that there are factors special to Scotland which required some different approach - for example, it was thought important to use indicators in parts of transport services which would try to measure the value added in handling North Sea Oil, and the importance of solicitors rather than estate agents in housing sales in Scotland had implications for how to treat parts of Professional and Scientific Services.

The results of this work are summarised in Table 5, which presents output indices for the Orders of the service sector in Scotland and in the UK. The Table contains figures for 1962 and 1980, where 1970 = 100. (Note that for some Orders the first figures available are for 1963.) Although in all cases the Scottish figures are fairly similar to those for the UK, there are some significant general conclusions. Scottish services grew more slowly than UK services in the 1960s (the Scottish indices start closer to 100 than the UK indices) and faster in the 1970s (the Scottish indices finish further from 100 than the UK indices). The only major exception to this generalisation is Professional and Scientific Series, where the Scottish growth rate was very close to that of the UK throughout - as this Order is dominated by Education Services and Medical and Dental Services, which together account for nearly 80% of the output of this Order in Scotland, similarity of Scottish and UK experience presumably reflects government policy. In most of the series, the turn-around from slower to faster growth seems to happen at about 1970, and can reasonably be associated with the acceleration towards UK levels of output, expenditure and earnings in Scotland in the late 1960s/early 1970s. The relative growth in Scottish services shows some evidence of slackening off from about 1978; a similar slow down of service growth is evident in the UK in the same period. It is regrettable that the data stop just too early to display the evidence for the two economies of the reaction in services to the sharp decline in manufacturing output recently experienced, but it is hoped that the new service sector output series will soon be rebased to 1980 and updated.

TABLE 5

Service Sector Output Indices (1970 = 100)

		1962		1980	
		Scotland	UK	Scotland	UK
XXII	Transport & Communication	89.71	78.41	134.4	124.6
XXIII	Distributive Trades	91.2	83.1	126.2	110.6
XXIV	Insurance, Banking & Finance	71.7	67.9	145.5	140.7
XXV	Professional & Scientific Servicing	82.11	81.51	134.5	133.3
XXVI	Miscellaneous Services	85.61	89.61	154.6	117.7

[1] 1963

5. Implications

Sections 3 and 4 of this paper have discussed in some detail the limitations of the available data about employment and output in Scottish services. The theme of this final section is to draw some tentative conclusions about what is implied for the health of the Scottish economy. The conclusions are tentative both because the data limitations mean that they must be interpreted with great caution and because much of the empirical work discussed in this section is at a very preliminary stage.

In section 2, it was suggested that critics of the growth of the service sector emphasise what they consider three dangers: balance of payments effects, labour productivity effects, and dynamic effects. The initial stage of this assessment will therefore offer some views on how far the growth of its service sector has exposed the Scottish economy to these dangers.

It is of course hard to offer any very authorative view about the Scottish balance of payments, since the evidence available is restricted to that from the 1973 input/output tables plus what preliminary results are available from the 1979 table. In UK terms, however, it is clear that some services are successful net exporters. John Eatwell (1982) poses the question "Wherein does Britain's comparative advantage lie?" and answers it in these terms "The most obvious area in which Britain seems to have some advantage is services. The banking and commercial sector, including insurance and shipping, though challenged by the development of financial services in New York still seem capable of holding its own in the world."

He does, however, go on to say that "holding its own is not good enough if it is to become the mainstay of Britain's balance of payments. For even today exports of manufactures earn twice as much revenue as do all private services put together(6). The trends, however, are illuminating. Table 6 contains a simplified outline of the UK current account balance of payments figures for 1960, 1970, 1980 and 1982. Even with the contribution of North Sea oil and gas featuring in the 'goods' calculations, it is evident from the Table that services represented a steadily growing source of balance of payments current account surplus for the UK up till 1980, and that their contribution has held up quite well since then. Tables 1, 2 and 5 have documented the growth in Scotland of Order XXIV, which can be equated with Eatwell's "banking and commercial sector", although Order XXIV remains rather less important in Scotland than in the UK, and although it may well be that the activities in that Order which particularly contribute to overseas trade are especially underrepresented in Scotland, it still seems reasonable to regard the growth of the importance of the Order in Scotland as making a positive contribution to Scotland's net exports.

It should be apparent from Section 4 that arguments based on the higher growth of labour productivity recorded for the manufacturing sector than for the service sector should be treated with great scepticism, because of the extent to which output in services is not measured independently of employment. It is, however, instructive to see what can be said about labour productivity in those MLHs in which it is possible to measure it meaningfully. Of the seventeen industries for which no part of output is measured by employment, one (MLH 892/893: Launderies/Dry Cleaning, Job Dyeing, Carpet Beating etc) showed a decline in productivity, seven showed positive growth rates of productivity at less than 2% per annum, a further seven exhibited growth rates between 2% and 4% and two industries (MLH 706: Port and inland water transport and MLH 708; Postal services and telecommunications) showed productivity growth rates in excess of 4%. These results tend to confirm the impression that it is misleading (though in some instances unavoidable) to measure output by labour input.

TABLE 6

UK Trade and Balance of Payments

	1960	1970	1980	1982
Goods				
- exports	3,737	8,150	47,415	55,546
- imports	4,138	8,184	46,183	53,427
balance	- 401	- 34	1,232	2,119
Services				
- exports	1,419	3,444	15,787	17,582
- imports	1,411	2,963	11,520	13,738
balance	8	481	4,267	3,844
Others				
- exports	788	1,682	10,156	14,142
- imports	623	1,306	12,421	14,677
balance	165	376	-2,265	- 535
Current account (surplus deficit)	- 288	823	3,235	5,428

Source: **National Income and Expenditure** 1982, 1983

For each industry the study examined the correlations between productivity growth and output growth, between output growth and the growth in Scottish GDP and between productivity growth in Scotland and productivity growth in the UK. For the purposes of these comparisons each series was detrended before the correlations were calculated. Thus the correlation coefficients measure the associations between deviations from trend (assumed exponential) of each variable. At a 95% confidence level all but one of the industries exhibited a significant positive correlation between productivity movements and output movements, the one exception being MLH 702: Road passenger transport. This may be taken to be consistent with the existence of a Verdoorn effect in service industries.

At the same confidence level seven industries exhibited a positive correlation between output fluctuations and movements in Scottish GDP. One industry (MLH 881/882: Cinemas, theatres, radio etc/Sport and other recreations) showed a significant negative association. This result suggests that modelling service sector output in terms of a naive economic base model and arguing that in some sense the service sector is driven by the growth of the domestic economy as a whole is liable to be an over-simplification that could not be expected to hold other than perhaps at a highly aggregative level.

Of the thirteen industries for which it is possible to compare the movements in productivity in Scotland and the UK over the whole of the sample period, eight exhibited a significant positive association between the movements in productivity. There would appear to be little systematic difference in productivity growth rates in Scotland than in the UK; six industries had slower productivity growth rates in Scotland than in the UK whereas seven industries had faster rates.

One further result is worth noting. A consideration of the cross-section of industries studied indicates that there is a fairly strong positive correlation between productivity growth in Scotland and productivity growth in the UK ($r = 0.75$) and a less marked, though still positive, correlation between productivity growth and output growth in Scotland ($r = 0.45$). It is obviously unwise to try to generalise from 17 MLHs to the whole of the service sector. Insofar as such generalisation would be legitimate, the evidence discussed here would suggest that in Scotland labour productivity rises in services where output is expanding so that there are gains in the average productivity of labour in service industries as output grows. What is implied for the average productivity of labour in the Scottish economy as a whole is another matter, however, as to identify the full implications the average productivity of labour in services would have to be compared with that in manufacturing, and that is, for reasons discussed earlier, not possible. Some of the MLHs in services do, however, exhibit what is by the normal standards of UK and Scottish manufacturing quite impressive productivity growth over the period 1962 to 1980 - Transport and Communication in particular shows average productivity growth typically of over 3% per annum both in Scotland and in the UK, and the figures are particularly high for the main growth industries within the Order. Such evidence as there is, then, suggests that at least in some instances it is untrue that as the service sector grows in relative importance labour productivity in the economy declines. It is unfortunate that it is not possible to identify whether such instances are the typical or the abnormal case.

It is, as suggested above, also very difficult to be decisive about the long-term dynamics of the service sector - whether the service sector really is dependent on growth elsewhere, or whether it has the capacity for self-sustaining growth. One obvious complication is the role of the public sector: the whole of the output of Order XXVII, some 75% of that of Order XXV, and over 40% of that of Order XXII is provided by the public sector. This public provision includes some services-telecommunications, health, education being the most striking examples - which economic theory suggests would grow in relative importance as the economy becomes more prosperous, but for some of these there is only limited market testing of the appropriateness of the extent of provision in the UK and in Scotland. The results quoted above of the productivity study are not particularly helpful on this issue of long-term dynamics, in that they find some association, but a rather weak one, between service output and Scottish GDP. Much fuller study at a fairly high level of disaggregation is needed to categorise industries, but preliminary work suggests that Scottish service industries are going to fall into three categories: those whose output appears to depend on activity in Scottish manufacturing; those whose output appears to depend on demand external to Scotland; and those whose output appears to depend on demand in Scotland other than for manufacturing. Industries falling into the first category are **prima facie** evidence for the dangers of de-industrialisation, whereas industries falling into the second and third categories are evidence at least for the view that the story is rather more complicated than that. The rise in the share of activity constituted by services may indeed be a cause of alarm: or it may, as others have suggested, be a welcome sign of the growing maturity of the economy.

The work discussed in this paper is still on-going. The next stages of the study, which are not yet sufficiently advanced for results to be reported, are to look in detail at possible determinants of output and of employment, by using rather more sophisticated versions of the output and employment equations in the model described in Dewhurst and Lythe (1984). It is hoped, however, that this interim report will explain to the reader what new data series will soon become available and give some idea for what sort of studies they might be useful. The analysis of the service sector, in Scotland as in the UK, is in its infancy, and the authors hope that their work will encourage those who are interested in the Scottish economy to grasp the opportunity this represents.

NOTES

1. The concept of de-industrialisation is carefully defined and the possible consequences of the phenomenon discussed in Blackaby (1978).

2. Namely, MLH 873 (Legal services), MLH 885 (Restaurants, cafes and snack bars), and MLH 893 (Dry cleaning etc) with r = 0.575 and 0.713 respectively.

3. There may be in practice some modification to this when the series is rebased from one set of weights to another. This will happen for example, if the weights reflect earnings; if earnings reflect the (unmeasurable) productivity increase, then rebasing will take changing labour productivity into account to some extent.

4. For details, see Hill (1971).

5. The CSO procedure for 1975 is discussed in Carter (1979).

6. Eatwell (1972) pp127-128.

REFERENCES

BLACKABY F (ed) (1978) **De-industrialisation** National Institute of Economic and Social Research, Economic Policy Papers 2, Heinemann.

CARTER J V (1979) "The Rebased Estimates of the Output-based Measure of Gross Domestic Product". **Economic Trends**, No 37, May.

DEWHURST, J H L & LYTHE, C M L (1984) **TEMPTRESS: Explorations with a Model of the Scottish Economy**, Aberdeen University Press.

DEWHURST, J H L, LYTHE C M L & PETERSON J C (1984) Reports on Output Index for the Scottish Service Sector and on Modelling Output, Employment and Labour Productivity, Industry Department for Scotland.

EATWELL J (1982) **Whatever Happened to Britain**, BBC/Duckworth.

FUCHS V R (1968) **The Service Economy**, National Bureau of Economic Research.

HILL T P (1971) **The Measurement of Real Product**, OECD.

REDDAWAY W B (1973) **Effects of Selective Employment Tax: Final Report**, Cambridge.

ROBERTSON J A S et al (1982) **Structure and Employment Prospects of the Service Industries**, Department of Employment Research Paper No 30.

ROBERTSON J A S & BRIGGS J M (1979) "Part-time Working in Great Britain", **Department of Employment Gazette**, July.

SMITH A D (1972) **The Measurement and Interpretation of Service Output Changes**, National Economic Development Office.